Computers in Economic Intelligence

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Prospects for push-button manipulation of the unwieldy intricacies of economic data.

COMPUTERS IN ECONOMIC INTELLIGENCE

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It is Monday, 21 May 1973, another day in the life of Jim Bond, analyst of the Soviet economy. While drinking his morning coffee he looks through his "mail," the contents of his in-box. This he does by his remote console, identifying himself to the central computer, and asking for mail. On the cathode-ray tube (CRT) screen appears a listing of descriptive titles with other identifying information and data an the length and priority of each item. Jim selects one—an administrative announcement—scans it, indicates how to dispose of it, and sees the list reappear without it.

Next he selects an article translated from a Soviet journal, and as he reads it from the CRT screen he considers under what descriptors it should be made retrievable for future reference. Some descriptors have already been attached to the article by a computer program and by other analysts; he adds others from the viewpoint of his specialty. This system assures a thorough cross-indexing and future availability to analysts of all descriptions.

He goes through all his mail this way, dumping some articles, reserving others for later reading, and adding some, with appropriate descriptors, to the permanent files. Next year he expects to be able to read articles in Russian from his CRT; the programers have yet to complete the required Cyrillic alphabet display routines and link in a dictionary routine to aid the imperfect Russian reader with automatic definitions on demand.

The phone rings: an urgent inquiry from the Congressional liaison office as to the amount of tin exported by the USSR to Ruritania during the past four years. Jim turns to his console and interrogates the file of Soviet foreign trade data, which has the amounts of tin exported to Ruritania in 1970 and 1971. From another file he gets a forecast of the data not yet published for 1972. Then he interrogates the file of ship and cargo movements and is given all tin shipments to Ruritania from the USSR in the period from January to date in 1973. In a simple programing language he instructs the computer to sum up this cargo data in a figure for the first part of 1973. Finally he enters all this information and his comments on it onto the console in a message routed to the caller. A bell will ring at the latter's console as the message is entered into his mail.

Later that morning he participates with other analysts in an evaluation of the latest economic data released by the Soviets. One of the first items is the production of cotton cloth. The new Soviet data indicate a 7 percent increase in output but the previous forecast was only 3 percent. Each analyst examines this divergence from his own viewpoint. Jim Bond retrieves the data for production of cotton, exports and imports of cotton, and inventories of cotton. He concludes that there is sufficient cotton available to support a 7 percent increase without reducing inventories substantially. Meanwhile, other analysts are retrieving information on textile plant capacity, consumption of cotton cloth by the civilian and military sectors, and other data related to cotton cloth production. A senior analyst at a CRT display reads the comments of each contributing analyst and prepares a summary at the console that is then displayed at each analyst's console for concurrence or comment. A similar procedure is followed for the rest of the data. Those items agreeing closely with forecasts (most of them) require little additional analysis. However, each major divergence is examined. Subsequently, the OER forecasting group will examine their "misses" and, if possible, adjust their econometric models.

After lunch we find Jim Bond quietly reading a book about the Soviet economy. A bell rings at his console indicating an incoming message. He logs into the system and receives the message that his intelligence memorandum prepared yesterday has been approved by the division chief except for minor revisions required. A list of the desired changes is displayed. Jim then retrieves the draft from the computer files and begins entering the required revisions. He only enters desired changes—the old draft is updated and line justification and pagination changed by the computer program. Upon completion from the console he will file memorandum in the division chiefs "mail," but not ring the bell!

Jim locks his console and prepares to end a typical working day for an economic intelligence analyst.

The story may read like science fiction but everything in it is "state of the art" in economics and computer science. The computer hardware exists (remote consoles, peripheral storage, large central processors) ; the computer software is emerging (on-line, time-sharing monitors, file management programs, and interactive. programing languages); and the tools of econometrics, programing, and systems design can be mastered. All that remains is to combine these elements—a task which *can* be accomplished during the next five years.

Two preconditions for the adoption of these techniques are, first, demonstration of the potential gains and, second, the education of analysts in the use of computers and quantitative methods. Programs are under way to fulfill these preconditions.

Currently the applications of computer techniques to economic intelligence are few in number. Personnel familiar with economic problems and computer systems design are still scarce. But the potential applications abound. To obtain a better idea of how computers are currently used in this field and how they might be used in the future, let us distinguish the several functions an economic intelligence analyst performs and examine the current and potential applications of computers under each of these functions. There are three primary functions—file management, analysis, and the communication of intelligence. Computers can aid analysts in all of these by increasing accuracy, saving time, and reducing costs.

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File Management

This term covers the process of scanning documents for relevance, extracting data, filing the extracted information according to some system, and retrieving information from the files in response to questions—the things we saw Jim Bond doing during his day. CIA has several operational projects using computer techniques to manage economic files.[1] These files, periodically updated and validated, provide the data base of reports both for the use of CIA analysts and for dissemination to the community at large. The advantages of having them automated are speed and consistency in the retrieval of information. Furthermore, they can frequently be maintained by intelligence assistants, and the analysts freed for other tasks that are less routine.

In the future the scope of computer-aided file management will be greatly expanded. It is now technically feasible to have a central data bank containing information on the international trade, income, population, military establishments, economic organizations, prices, and other economic variables of most countries of the world. Such a central store would greatly enhance the ability of research components to rely on strict quantitative methods in their estimates and would ensure that the same data are used by all.

As the CIA central reference files become more completely automated,[2] the economic analysts should be able to make retrospective searches of intelligence documents on a variety of topics, thereby reducing their need to maintain their own files for all anticipated problems. Work is also under way in R&D components on automatic systems for scanning text and extracting desired information from it.

At present the updating of ADP files is periodic, by batches, and printouts are also provided periodically. Many estimating activities, however, require continuously current data. Time-sharing systems (under which the computer can serve a number of customers at remote locations simultaneously) can provide, at relatively love cost, the required currency. Therefore, it is planned to put the files of international ship and cargo movements to critical areas, for example, into a system in which data can be entered and retrieved at consoles in the analysts' offices.

All these developments point to a time in the not too distant future when each analyst, or at least each branch, will have a remote console which will provide immediate access to a wide variety of files of documents and data, and enable the analyst to retrieve and manipulate quantities of information quickly, cheaply, and accurately.

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Analysis

The analysis function encompasses the use of judgment, the performance of calculations, the application of economic theory, and mathematical modeling. Computers are now used to calculate the Soviet national income and product accounts and compare them with the US accounts, to calculate the indexes (percentages of increase from a given base) of Soviet industrial production, and to calculate foreign aid requirements and repayments under various hypothetical situations. The use of the computer on these projects has eliminated a substantial number of hours of desk calculator work. Analysts also can test the effect of various assumptions on the results of the calculations (e.g., the sensitivity of the distribution of GNP by sector to changes in the input-output table or turnover tax component of final demand), an exercise not always feasible before because of the amount of calculation required.

Work has begun on the construction of an econometric model (actually several models) of the Soviet economy based on the 1959 input-output table published in the USSR in 1961. The model is a set of equations describing the interdependence of various components of the economy (e.g., prices, income, output of industry and of agriculture, capital stock, employment, and consumption). When the model is complete, projections of these components under alternative assumptions about increases in military output, the size of labor force, the amount of capital investment, and trends in productive efficiency can be obtained with the aid of a computer program.

The potential in this area is likewise enormous. Eventually we should have models of most foreign economies, of international trade, and of other processes important to economic intelligence. The key to success in this area is to involve the analysts in designing the models and interacting with their application. This requires educating the analysts in the use of quantitative tools and providing them with adequate computer programs, and assistance in the application of these tools.

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Communication

The communication function, whether exercised in a telephone call or a formal report or briefing, requires mutual understanding, which computers can improve substantially. When both data bases and analytical techniques have been standardized for all analysts by the use of computers, it will be easier to understand what steps an analyst has taken to reach a given conclusion, and other analysts will be able to reproduce these steps and validate the conclusion. The direct communication of inquiries to a data base will also eliminate the need to bother an analyst with simple questions of fact.

Computers can be employed to advantage in the graphic plotting of data and in the preparation of textual reports. Various organizations have systems under which a secretary can place an analyst's rough draft and any subsequent revisions into computer storage from a remote console. The latest version can be printed automatically at any stage. In the brief period that such systems have been in use they have demonstrated that substantial savings in time and costs can be expected from them.

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Preparatory Tasks

Computers will play an ever-increasing role in economic intelligence. The analyst will work in an environment of well-organized files, substantial aids to calculation, and other routine-eliminating tools enabling him to apply his mind directly to intelligence problems. The manager will find it easier to transfer responsibilities from one analyst to another because files and the techniques for exploiting them will be standardized. What needs to be done at present to promote this environment of the future?

One major requirement has already been mentioned—a vigorous program to educate economic analysts and management in the use of computers. Certain key personnel will need intensive instruction in programing, quantitative methods, and systems design. A workshop was conducted during the spring and summer of 1968 for ten analysts in these areas. A similar activity is planned for early 1969.

A gradual increase in the number and sophistication of operational applications for computer systems in projects involving file management, analysis, and communication will lead to better working knowledge of the use of computers on the part of analysts as well as to the development of machine-readable data collections.

Much of the expertise and design of future computer systems, particularly remote-console, time-sharing systems, will come from R&D and computer service units. It is desirable that economic intelligence officers keep aware of developments in this direction and at the same time encourage the computer experts to examine economic applications.

Active participation in any community projects for building up data collections, putting documents into machine-readable form, standardizing classification systems, and similar activities[3] a will of course be of direct benefit.

If these preliminary tasks are not neglected, the economic intelligence analyst will live a very different official life in 1973 than he has in 1968.

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1 Notably concerning Chinese nutrition, Communist economic assistance, and Soviet foreign trade.

2 See Paul A. Borel's "Automation for Information Control" in Studies XI 1, p. 25 ff.

3 Such as that described in Zane Thomton's "Community Progress in Information Handling," Studies XI 1, p. 13 ff.

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